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IS 9019 (1979): Code of practice for installation, operation and preventive maintenance of power threshers
[FAD 21: Farm Implements and Machinery]



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IS : 9019 - 1979

Indian Standard

**CODE OF PRACTICE FOR
INSTALLATION, OPERATION AND PREVENTIVE
MAINTENANCE OF POWER THRESHERS**

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**INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002**

Indian Standard

CODE OF PRACTICE FOR INSTALLATION, OPERATION AND PREVENTIVE MAINTENANCE OF POWER THRESHERS

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AMENDMENT NO. 1 JUNE 1980

TO

IS:9019-1979 CODE OF PRACTICE FOR
INSTALLATION, OPERATION AND PREVENTIVE
MAINTENANCE OF POWER THRESHERS

Alterations

(Page 3, clause 0.3, last sentence) -
Substitute the following for the existing
sentence:

"The third Indian Standard, IS:9129-1979
'Technical requirements for safe feeding
systems for power threshers' covers the tech-
nical requirements for safe feeding systems
for power threshers."

(Page 7, clause 9.1) - Substitute 'tamper'
for 'temper'.

(AFDC 51)

Reprography Unit, ISI, New Delhi

**AMENDMENT NO. 2 JUNE 1996
TO
IS 9019 : 1979 CODE OF PRACTICE FOR
INSTALLATION, OPERATION AND PREVENTIVE
MAINTENANCE OF POWER THRESHERS**

(Page 7, clause 8.2.1) — Delete.

(FAD 59)

Reprography Unit, BIS, New Delhi, India

Indian Standard

CODE OF PRACTICE FOR INSTALLATION, OPERATION AND PREVENTIVE MAINTENANCE OF POWER THRESHERS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 16 February 1979, after the draft finalized by the Harvesting, Threshing and Transport Equipment Sectional Committee had been approved by the Agricultural and Food Products Division Council.

0.2 Mechanization of the threshing operations which played a pivotal role in ushering in an era of green revolution in the country also brought in its wake a chain of accidents to farm workers resulting in their temporary or permanent disability. This brought to the fore the need for some immediate measures to safeguard the farm workers against avoidable accidents be it due to any of the vulnerable factors of machine, man, etc. As a number of reports of many farm workers specially the young losing their limbs poured in, the urgency to provide for safety provisions became more pronounced.

0.2.1 Punjab Agricultural University, Ludhiana conducted a survey on the accidents during the wheat threshing season of 1976. As many as 294 cases were examined and it was observed that the factors responsible for accidents are as under:

<i>Factors of Accidents</i>	<i>Percentage</i>
i) Human	72.9
ii) Machine	12.9
iii) Crop	9.0
iv) Situational	5.2

0.3 Safety provisions for all the above factors of accidents are covered in three separate Indian Standards. This standard covers the human, crop and situational factors. The other standard IS : 9020-1979* covers general and safety aspects of machine factor. Another standard covering the technical requirements for safe feeding devices for power threshers is under preparation.

*General and safety requirements of power threshers.

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0.4 In preparation of this standard, assistance has been derived from Tractor Training Centre (Ministry of Agriculture and Irrigation), Hissar.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers the recommendations for installation, operation and preventive maintenance of power threshers.

2. TERMINOLOGY

2.1 For the purpose of this standard, the terms and definitions given in IS : 9020-1979† shall apply.

3. RECOMMENDATION FOR THRESHING YARD

3.1 The threshing yard shall be kept relatively free from all kinds of obstructions. However, some shade should be provided for workers.

3.2 As far as possible, the threshing yard should be away from the residential area. It shall not be located near the railway tracks and under the power transmission lines.

3.3 A first aid box or kit shall be provided at the site.

3.4 Adequate fire protection facilities shall be provided. It may be some buckets of sand and water and two 5-kg dry powder fire extinguishers conforming to IS : 2171-1972‡. The extinguisher shall be in a serviceable condition. It shall also be ensured that these extinguishers are inspected and maintained properly and that all the workers are well conversant with the method of operation.

3.5 In case the threshing is to be done in night, proper arrangement shall be made for light. In case of electrical installation, it shall be in accordance with IS : 732-1963§ and to the requirements of Indian Electricity Rules.

*Rules for rounding off numerical values (*revised*).

†General and safety requirements for power threshers.

‡Specification for portable fire extinguishers, dry powder type (*first revision*).

§Code of practice for electrical wiring installations (system voltage not exceeding 650 volts) (*revised*).

4. INSTALLATION OF PRIME MOVER

4.1 The prime mover, unless directly mounted on the thresher, shall be located such that the straw (*BHUSA*) being blown from the thresher does not fall on it.

4.2 As far as possible, the prime mover should be kept at a safe distance from the feeding mechanism or feeding platform.

4.3 In case of the prime mover mounted on the threshers, protection should be provided from the straw and dust falling on it.

4.4 The prime mover shall be level both longitudinally as well as laterally.

4.5 The exhaust pipe of the tractor shall be fixed vertically upward and never under the chasis. The tractor shall be installed at a safe distance from the crop heap.

4.6 In case of permanent installation of electrical motors, assistance should be taken from IS : 900-1965*. Even for temporary installation of motors, the points given under 7 of IS : 900-1965* should be observed. The main-switch of the motor should be fixed within easy reach of the operator.

5. DETAILS TO BE CHECKED BY THE BUYER OF THE THRESHER

5.1 While purchasing the thresher, the purchaser should check the following:

- a) The power required for the thresher is in accordance with the source of power available with him.
- b) The direction of rotation and the number of rev/min has been marked on the thresher.
- c) The safety provisions (*see* IS : 9020-1979†) have been provided in the thresher.
- d) Whether the thresher has been certified by any certifying agencies, such as ISI or it has been tested by any independent testing authority.
- e) The operator's manual in a language understood by him and that he understands the meaning, has been provided.
- f) The special tools and accessories, if any, have been supplied by the manufacturer.
- g) The after-sale service facility is available.

*Code of practice for installation and maintenance of induction motors (*revised*).

†General and safety requirements for power threshers.

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5.2 The buyer shall familiarize himself about the operation and controls of the threshers.

5.3 Before purchasing, the thresher shall be run idle and the presence of any undue knocking or rattling sound, alignment and tension of drive belts to avoid slippage, unusual vibration of thresher and smooth running of fan and oscillation of sieve should be checked.

6. INSTALLATION OF POWER THRESHER

6.1 The direction of the thresher should be set in consonance with the direction of the prevailing wind, that is, straw (*BHUSA*) outlet should be kept in the same direction as that of the wind and not against the wind.

6.2 The thresher shall be properly anchored in the ground or the wheel should be grounded firmly to ensure the stability during the operation.

6.3 The thresher should be set level both longitudinally as well as laterally.

6.4 The main drive of the power thresher should be aligned with the drive of the power unit.

6.5 The direction of the movement of the belt should be adjusted to suit the direction of rotation of the threshing drum.

6.6 The proper tension of the driving belt should be maintained.

6.7 All components including guards and other safety devices should be intact. The fasteners should be checked and tightened, if required. All the lubrication points should be properly greased or oiled as per the manufacturer's recommendation.

6.8 Proper platform should be made for facilitating smooth feeding of the crop and for preventing the falling down of the operator.

7. CROP CONDITION

7.1 For efficient operation and to avoid sparking hazard inside the threshing drum, care should be exercised to ensure that the crop to be threshed is in proper condition. For wheat thresher in vogue, the crop should be sufficiently dry.

8. OPERATIONAL CONDITIONS

8.1 Concave clearance, slope of the sieve, eccentricity of the shaking mechanism should be checked and adjusted in accordance with the manufacturer's recommendation.

8.2 The thresher should be operated at the speed recommended by the manufacturer for a given crop. The size of the main pulley to be fitted on the thresher may be calculated using the following formula:

$$D_T = \frac{D_p \times N_p}{N_T}$$

where

D_T = diameter of the thresher pulley, mm;

D_p = diameter of the prime mover pulley, mm;

N_p = speed of prime mover pulley, rev/min; and

N_T = speed of thresher pulley, rev/min.

8.2.1 The recommended speed for some of the crop is given in Table 1 for guidance:

TABLE 1 RECOMMENDED SPEED OF THRESHING DRUM

Sl. No.	CROP	SPEED OF THE DRUM	
		rev./min	m/s
(1)	(2)	(3)	(4)
i)	Wheat	550 to 1 100	20 to 30
ii)	Barley	740 to 1 080	20 to 26
iii)	Paddy	675 to 1 000	16 to 25
iv)	Bajra	400 to 550	12 to 16
v)	Jowar	400 to 675	12 to 20
vi)	Gram	400 to 750	12 to 22
vii)	Peas	430 to 750	13 to 22

8.3 The speed of the blower, separating and cleaning mechanism, etc, should be checked and adjusted in accordance with the manufacturer's recommendations.

8.4 Before starting the prime mover, the main thresher pulley should be turned by hand to ensure that there is no obstruction inside the thresher.

8.5 The crop should be fed continuously and uniformly.

9. SAFETY PRECAUTIONS IN OPERATION

9.1 Do not temper with or remove the guards or safety devices.

9.2 Do not wear loose dress, hand bangles, wrist watch, etc, while working.

IS : 9019 - 1979

- 9.3 Do not smoke and light fire near threshing yard and thresher.**
- 9.4 Never operate the thresher under the influence of intoxicants, like liquor, opium, etc.**
- 9.5 Do not stand on the thresher.**
- 9.6 Do not cross over the belts.**
- 9.7 Do not work if you feel tired.**
- 9.8 Only skilled and trained workers should be employed for feeding the crop. Children below 16 years of age and elderly people above 50 years lacking physical stamina should be discouraged to work specially for feeding the crop.**
- 9.9 While feeding the earheads or threshing such crops where only earheads are required to be fed, due care should be exercised to keep the hand at a safe distance. To ensure proper feeding, suitable pushing device may be used instead of hand for pushing.**
- 9.10 Be always attentive while feeding the crop and avoid too much of talking.**
- 9.11 Due care shall be taken to keep the hand at a safe distance while feeding.**
- 9.12 To reach the chute for feeding the crop, do not stand on a bundle of crop or bullock cart or trolley. In case cart or trolley is used as feeding platform obstruction should be provided to the wheels so that it should not move. The cart or trolley should be level.**
- 9.13 Excepting those adjustments which are required to be carried out when the thresher is being operated, any adjustment to be carried out should be done after switching off the prime mover.**

10. PREVENTIVE MAINTENANCE

- 10.1 Make sure that the tension of the belts is proper.**
- 10.2 Check all the fastening bolts and screws, and make sure that they are tight.**
- 10.3 In case of pneumatic tyres, the inflation shall be according to the recommendation of the manufacturer.**
- 10.4 Remove foreign matter, if any, from the hopper, threshing and cleaning unit.**
- 10.5 Check and repair any damaged or bent parts.**

10.6 Before starting thresher, check various parts to ensure free rotation of components like drum, fan and sieve.

10.7 Occasionally check the sieves and clean if openings are clogged.

10.8 Clean and grease the lubricating points according to the recommendation of the manufacturer.

11. DIAGNOSIS OF COMMON FAULTS AND THEIR REMEDIES

11.1 Information in regard to some of the common faults, their causes and remedies is given in Appendix A.

12. TRAINING AND FAMILIARIZATION

12.1 Generally, the farm workers are not conversant with the operation and controls of power thresher. The care shall, therefore, be taken to ensure that each worker understands the safe operation of the thresher and the safety precautions particularly the following:

- a) The method of stopping and starting the prime mover;
- b) The hazards which are known to arise in the course of normal working;
- c) The hazards liable to arise from bad practices, inattention and misuse of controls;
- d) The hazard liable to arise from the use of intoxicant;
- e) The purpose of guard and safety device and how they may fail;
- f) The ability to recognize over loading or abnormal loading conditions; and
- g) The necessity of immediately informing the person incharge if any fault or defect arises and the danger to the worker in attempting to correct the fault.

12.2 Clear instructions shall be given to the workers that guard or safety devices shall not be tampered with, removed or altered in any way and that adjustable guards shall be re-adjusted only by the authorized person.

12.3 The owner and the operators of the thresher should be conversant with the rights of workers regarding compensation in case of live accidents which they may suffer during operation; legislation, if any; suitable insurance coverage; etc.

13. INSTRUCTION FOR OFF-SEASON STORAGE

13.0 The points given below should be observed for storing the thresher during off-season.

13.1 After the work is over, run the thresher idle for some time so that practically all the material fed are removed.

13.2 Disconnect the power source and remove manually all the grains and straw.

13.3 Remove all belts, clean them and store in a safe place to prevent their spoilage from heat, dust and rain.

13.4 Wash, clean and dry the thresher completely.

13.5 Check the condition of the parts. Undertake necessary repairs and/or replacements to get the thresher in proper condition for the next season.

13.6 Repaint the thresher where necessary, or apply a coat of grease or used engine oil to avoid rusting.

13.7 Dismantle the sieve and repaint, if necessary, or apply a coat of grease or used engine oil.

13.8 Clean all the lubricating points specially grease cups and bearings with kerosene or diesel oil and lubricate them with fresh oil or grease.

13.9 Close all the passages through which it might be possible for vermins to get in.

13.10 Store the thresher inside a dry shed. No water should fall over the thresher during rainy season. In case shed is not available, the thresher should be completely covered with waterproof canvas, plastic or tarpaulin.

13.11 Jack the thresher frame horizontally on wooden blocks or bricks in case of pneumatic tyres. If water is filled in tyres, drain the same.

APPENDIX A

(Clause 11.1)

THRESHER TROUBLE SHOOTING

<i>Sl No.</i>	<i>Trouble</i>	<i>Reason</i>	<i>Remedy</i>
(1)	(2)	(3)	(4)
i)	Blockage of the drum	Overfeeding Belt loose Drum speed too low	Avoid overfeeding Check all the belts for proper tension Increase the speed to recommended number by changing drum pulley or by adjusting belt tension

<i>Sl No.</i> (1)	<i>Trouble</i> (2)	<i>Reason</i> (3)	<i>Remedy</i> (4)
		Crop is moist	Await proper drying of the crop
		Crop is infested with weeds	Remove the weeds as far as possible
		Concave clearance is less	Adjust the proper clearance
ii)	Breakage of the grain	High drum speed	Decrease the drum speed to the required number
		Concave clearance is less	Adjust the proper clearance
iii)	Grain blows with straw	High fan speed	Adjust the proper fan speed
		Blocked sieve holes	Clean the sieve holes
iv)	Straw with grain	Low fan speed	Adjust the proper fan speed
		Improper size and adjustment of sieves	Use proper size of sieves and make proper adjustments
		Too much and uneven feeding	Proper and uniform feeding
		Concave may be blocked	Clean the concave
		Low shaking speed	Adjust the proper speed
v)	Grain with tailings	Upper sieve blocked	Clean upper sieve
		Improper sieve slope	Adjust proper sieve slope
		Improper size of sieve	Use proper size of sieve
		High shaking speed	Decrease shaking speed
vi)	Too many unthreshed heads	Low cylinder speed	Increase cylinder speed
		High concave clearance	Decrease concave clearance
vii)	Vibration in thresher during operation	Improper installation	Install the thresher properly
		Fasteners and bearings are loose	Tighten the fasteners, change or tighten bearings
		Worn out components	Repair or replace the components

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

QUANTITY	UNIT	SYMBOL
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

QUANTITY	UNIT	SYMBOL
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

QUANTITY	UNIT	SYMBOL	DEFINITION
Force	newton	N	1 N = 1 kg.m/s ²
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m ²
Frequency	hertz	Hz	1 Hz = 1 c/s (s ⁻¹)
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m ²

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